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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,723	10/10/2001	Hans Peter Brack	GEPL.P-038	3641

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EXAMINER

BOYKIN, TERRESSA M

ART UNIT	PAPER NUMBER
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1711

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DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/682,723	BRACK ET AL.	
Examiner	Art Unit	
Terressa M. Boykin	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) 40-47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5,6. 6) ☐ Other: _____

Provisional Double Patenting

Claims 1-47 are provisionally rejected under the judicially created doctrine of double patenting over claim 1 of copending Application No. 10268395. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: both references are drawn to a method for end-capping polycarbonate resin and composition made thereof as well as the same intended uses as claimed in the applicants invention above.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 1711

Claims 1-39 are rejected under 35 U.S.C. 102(b) as being anticipated by EPO 0764673; EP 0360578. Note below.

EPO **0764673** discloses a process for the production of a terminal-blocked aromatic polycarbonate by melt-polycondensing an aromatic dihydroxy compound and diphenylcarbonate, the process comprising adding a specific carbonate or carboxylic ester after a polycarbonate formed has an intrinsic viscosity of at least 0.3 dl/g, to form a terminal-blocked polycarbonate having an intrinsic viscosity which is greater than, or smaller than, the intrinsic viscosity of the polycarbonate formed before the addition by 0.1 dl/g at the most; and a process for the production of a polycarbonate having an increased intrinsic viscosity by melt-polycondensing an aromatic dihydroxy compound and diphenylcarbonate, the process comprising adding a specific diaryl carbonate or dicarboxylic diaryl ester after a polycarbonate formed has an intrinsic viscosity of at least 0.3 dl/g, to form a polycarbonate having an intrinsic viscosity greater than the intrinsic viscosity of the polycarbonate formed before the addition by more than 0.1 dl/g.

EPO **0360578** discloses processes for the production of polycarbonates by melt polycondensation of an aromatic dihydroxy compound and a carbonic acid diester or a diphenyl carbonate compound wherein said polycondensation is carried out in the presence of from 0.05 to 15 mol %, based on 1 mole of the aromatic dihydroxy compound, of a phenol having from 10 to 40 carbon atoms, a carbonic acid diester having from 17 to 50 carbon atoms or a carbonic acid diester having from 13 to 16 carbon atoms, using a catalyst comprising (a) a nitrogen containing basic compound, (b) from 10×10^{-8} to 10×10^{-3} mole, based on 1 mole of the aromatic dihydroxy compound, of an alkali metal or alkaline earth metal compound, and (c) boric acid or boric ester. Also disclosed is a polycarbonate in which from 5 to 30 % of its terminal groups are hydroxy groups and it has a sodium content of not more than 1 ppm and a chlorine content of not more than 20 ppm.

Note with regard to applicants' claim 2 wherein the end capping reagent contains the symmetrical activated aromatic carbonate and theform 10:90 to 90:10, with regard to applicants' claim 3 (dependent upon claim 2) *wherein the end capping reagent is added in an amount such that the ratio of total carbonate in theis from 0.5 to 3*, with regard to claim 4 wherein the end capping reagent is added in amount such that the mole ratio.... is from 0.5 to 3, note EPO **0764673** page 7 lines 38-39, tables 2-11; EP **0360578** note abstract and page 2 lines 35-60 and table 1; .

With regard to claims 5 -11 note EPO **0764673** note table 3 lines 10-20 and 25-55 and page 5; EP **0360578** note page 5 formulas 2 and 5 and table 1.

Art Unit: 1711

With regard to claims 12-14 note EPO **0764673** note page 6 line 45 structure 3 (page 3 lines 25-57 for definition of R1) EPO **0360578** note page 3 lines 64 through page 4 line 6 and table 1.

With regard to applicants claim 15-27 note EPO **0360578** page 5 formula 5 and page 6.

With regard to claims 28-31 note EPO **0764673** page 12 lines 20-23.

With regard to claims 35-36, 37-39 note EPO **0764673** tables 1-11.

Claims 1-34 are rejected under 35 U.S.C. 102(a or e) as being anticipated by USP 6525163 note below; or USP 6500914 note below.

USP **6525163** discloses polycarbonate having increased end-cap levels is made by adding an end-capping agent to the polycarbonate, preferably after the polycarbonate has reached a number-average molecular weight of about 2,000 to 15,000 Dalton. The end-capping agent has the formula: as disclosed in structure 1 and structure 2.

(See also claims 1-23).

Note with regard to applicants' claim 2 wherein the end capping reagent contains the symmetrical activated aromatic carbonate and theform 10:90 to 90:10, with regard to applicants' claim 3 (dependent upon claim 2) *wherein the end capping reagent is added in an amount such that the ratio of total carbonate in the.....is from 0.5 to 3*, with regard to claim 4 wherein the end capping reagent is added in amount such that the mole ratio..... is from 0.5 to 3

With regard to claims 5 -11 note examples 1-3 in col. 9.

With regard to claims 12-14 note col. 4 lines 5-50.

With regard to applicants claim 12-14 col. 3 and 4.

With regard to applicants' claims 15-27 note examples 1-3.

With regard to claims 28-31 note USP **6525163** discloses that "the method of the invention may be used to produce polycarbonates that contain less than about 500 ppm, and even less than 100 ppm, of unreacted end-capping agent."

With regard to claims 25- 27 note that the reference USP **6525163** states that "apparatus/method for feeding the end-capping agent is not specially limited. The end-

Art Unit: 1711

capping agent may be added in the form of a solid, a liquid, a melt or a solution thereof. Further, the end-capping agent may be added in a predetermined amount once, or it may be separated into predetermined amounts and added several times. In one embodiment, it is added to the process as a powder or liquid by means of a *static mixer*"

With regard to claims 28-34 note that the reference USP **6525163** discloses that the process of the can be used to form polycarbonate that has a content of ortho-substituted phenols of less than about 500 ppm, a content of unreacted end-capping agent of less than about 500 ppm, and a content of activated end groups of less than about 2,500 ppm. The terminal-blocked polycarbonate product may contain terminal 2-(phenylcarbonyl)phenyl, 2-(phenoxycarbonyl)phenyl, or 2-(benzyloxycarbonyl)phenyl groups which can be characterized as activated end groups. It is desirable to limit the introduction of such end groups, for example to levels of about 2,500 ppm or less. The introduction of these activated end groups occurs because of reaction of the non-activated side of the asymmetric activated carbonate end-capping agent. The process is a melt or transesterification process. In the melt process, polycarbonate is produced by the melt polycondensation of aromatic dihydroxy compounds (A) and carbonic acid diesters. Examples of the carbonic acid diesters (B) include diphenyl carbonate; ditolyl carbonate; bis(chlorophenyl)carbonate; m-cresyl carbonate; dinaphthyl carbonate; bis(diphenyl)carbonate; diethyl carbonate; dimethyl carbonate; dibutyl carbonate; and dicyclohexyl carbonate. In one embodiment of an industrial process, diphenyl carbonate (DPC) is used. The carbonic diester component may also contain a minor amount, e.g., up to about 50 mole % of a dicarboxylic acid or its ester, such as terephthalic acid or diphenyl isophthalate, to prepare polyesterpolycarbonates. In preparing the polycarbonates, usually about 1.0 mole to about 1.30 moles of carbonic diester are utilized for every 1 mole of the aromatic dihydroxy compound. In one embodiment, about 1.01 moles to about 1.20 moles of the carbonic diester is utilized. The reference discloses that the process of the invention, additional/optional terminators or end-capping agents of the prior art may also be used. Examples of terminators include phenol, p-tert-butylphenol, p-cumylphenol, octylphenol, nonylphenol and other endcapping agents well-known in the art.

With regard to claims 1-34 note that USP **6500914** discloses a method for end-capping polycarbonate resins, comprising the step of processing a mixture comprising a polycarbonate having free hydroxyl-end groups and an end-capping reagent in a melt transesterification reaction to produce a polycarbonate resin, wherein the end-capping reagent comprises a mixture of: (a) at least one species of a symmetrical activated aromatic carbonate, and (b) at least one species of a symmetrical non-activated aromatic carbonate, whereby said end-capping reagent reacts with at least some of the free hydroxyl end-groups of the polycarbonate to produce an end-capped polycarbonate resin. See also claims 2,3,4 and 9-11.

The relative amounts of the two types of carbonates (activated and non-activated) in the end-capping reagent can be varied depending on the product characteristics desired. Higher amounts of activated carbonate will increase the degree of coupling

Art Unit: 1711

obtained, while higher relative amounts of the non-activated carbonate can be used to enhance the amount of chain termination. In general, the mole ratio of non-activated to activated carbonates will suitably range from 10:90 to 90:10. The end-capping reagent containing activated and non-activated carbonates is combined with a preformed polycarbonate polymer having free hydroxyl end groups. The preformed polycarbonate polymer may be any type of polycarbonate, and can be formed by either melt transesterification or an interfacial process, although most commonly the preformed polycarbonate polymer would be formed from the melt transesterification process.

The carbonic diester component may also contain a minor amount, e.g., up to about 50 mole % of a dicarboxylic acid or its ester, such as terephthalic acid or diphenyl isophthalate, to prepare polyesterpolycarbonates. In preparing the polycarbonates, usually about 1.0 mole to about 1.30 moles of carbonic diester are utilized for every 1 mole of the aromatic dihydroxy compound. In one embodiment, about 1.01 moles to about 1.20 moles of the carbonic diester is utilized.

The amount of end-capping reagent appropriately utilized can be quantified with reference to the amount of free hydroxyl end groups in the pre-formed polycarbonate polymer. In general, the mole ratio of total carbonate to free hydroxyl end groups is within the range of from 0.5 to 2.0, depending on the level of end-capping desired.

In some reactor systems, it may be difficult to reach the desired equilibrium ratio of introduced or incorporated non-activated and activated end-groups (the non-activated end groups are preferentially present at equilibrium) due to poor mixing, short residence time, or rapid volatilization of one component. In such a case the ratio of introduced non-activated to activated end groups can be favorably increased by melt mixing the activated and non-activated aromatic carbonates together in the presence of a small amount of basic catalyst (such as tetramethylammonium hydroxide) to produce a scrambled product consisting of a pre-equilibrated or *statistical mixture* of carbonates.

Consequently, each of the references discloses a method of preparing end-capped polycarbonate prepared from the same steps and components as claimed by applicants. In view of the above, there appears to be no significant difference between the reference(s) and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

Objected Claims

Claims 40-47 are objected to for depending upon rejected claims 1-14 above and would be allowable if rewritten in independent form.

Art Unit: 1711

Correspondence

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Examiner Terressa Boykin, via the receptionist whose telephone number is (703) 308-2351. The examiner can normally be reached on Monday through Friday from 8:00a.m.-5:30 p.m.

tmb

A handwritten signature in black ink, appearing to read "Terressa Boykin". The signature is fluid and cursive, with the first name "Terressa" being more prominent than the last name "Boykin".

Examiner Terressa Boykin
Primary Examiner
Art Unit 1711